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ABSTRACT

The relationship of architecture to human behavior is a topic of increasing concern both to designers and behavioral scientists. To further evaluate the extent of the relationship a series of preliminary investigations has been undertaken. The primary means of measurement was informal conversations of dental students as related to the circumstances under which the interaction took place. Categories established to describe the activities during which the conversations took place were--(1) carrying out a specific stationary activity, (2) waiting, (3) in transit, and (4) no specific activity. Specific spatial areas were related to these activities and some initial conclusions drawn, such as the observation that people in the middle of a laboratory bench tend to have more interactions. This research is stated to be exploratory in nature and to require further refinement. (RS)

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Interactional Patterns Among Dental School Students And The Influence of Building Design

Final Progress Report

on the

Planning Study: Behavioral Factors in Dental School Design

by

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Abstract

Data was collected describing the informal conversations dental students have relative to the architectural setting. Dental students form many small conversational groups depending on their opportunity for face-to-face contact. The architectural design of the dental school building is one factor that influences the frequency and type of interaction which occurs. Many of these interactions are academically related and contribute to the learning process.

Text of Report[1]

Currently there is increasing interest at a number of American universities in studying and articulating principles of environmental design. One result has been to focus attention on the relationship between architecture and human behavior, which has been suggested by a number of recent research studies, many of them at the pilot level. This interdisciplinary area of environmental design which taps the thinking of architects, industrial designers, city planners, social psychologists, and sociologists is still quite speculative, and has so far produced only a small body of data.

In this report we present data from an exploratory study examining the influence of dental school building design upon the quality and quantity of student informal conversations. The purpose of the study was to find out what patterns of interaction commonly exist among dental school students, and how the architectural design of the building influences these interactional patterns. It was found that architectural variables such as the layout of a building and the size and placement of its component spaces influence group structure among students, which in turn influences the frequency, duration, and content of conversations. Informal conversations were defined as all student conversations taking place in dental school departmental buildings during the academic day, except those occurring between a student and instructor within the formal framework of a class. Informal conversations were chosen as the unit of study because these represent behavior that lies at the more spontaneous and voluntary end of the interactional continuum. Consequently we speculated that informal conversations may be more directly influenced than formal conversations by the building's architectural design. We also speculated -- using social psychology concepts relating to communication and

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attitudes -- that student informal conversations may contribute importantly to learning, both by supplementing the process of acquiring factual material in the lecture hall or laboratory, and by shaping attitudes toward learning. While this exploratory study's data about conversations were collected in connection with dental school buildings, the observations which emerge may be in part generalizable to other college and university "departmental" buildings of the kind that function as a relatively self-contained academic environment, and contain classrooms together with student work-spaces, offices, and laboratory-like facilities used by faculty and students who spend much of their academic day there.

The variables studied were behavioral ones describing informal conversations which dental students have. Since one purpose of the study was to find out what kind of preliminary data could be readily collected about conversational behavior of students in buildings with different design and layout, a student volunteer from each of four dental schools was used to collect self-report data about his interactions with students and faculty. Details about each conversation recorded by the student were systematically entered on an interaction recording sheet. By definition, student informal conversations included all conversations between students and any casual conversations between students and instructors. Although the distinction between formal and informal conversations may sound somewhat situational, no difficulty was experienced in using it in the dental school setting.

The dental school students collecting self-report data were asked to provide detailed information about approximately two of their interactions per day, over a period of four months. The reason for having students describe only a small number of interactions per day lay in their busy school schedule which limited the amount of time available for daily recording of data. Therefore, a long-term

data collection period was used in order to get a full sampling of different kinds of interactions. The students were told the purpose of the research was simply to study informal communication in dental schools, and they should therefore report interactions without regard to content, even including very brief or seemingly trivial conversations. Periodically the experimenters gave additional definition to the task by asking the students to give a few additional reports in certain categories which had been little covered. The purpose was to make sure descriptive data was obtained about many different kinds of interactions. Doubtless, as with any set of directions, this influenced the results.

To get some information about the total number of informal conversations a student might have during an academic day, a more complete sampling was obtained from two students for a two-week period, during which they recorded all their informal interactions, collecting, however, only a minimum of data about them. For one student the number per day ranged from 13 to 31, with a daily average of 17; while for the other student the number ranged from 40 to 52, with a daily average of 44.

Of the 326 informal conversations about which detailed information was collected during a period of four months, 23% involved two students, 56% involved three or more students, 9% involved one faculty member and one student, and 6% involved one faculty member and several students.

In this connection, it is interesting to note the results of a follow-up questionnaire, which aimed at identifying interaction needs by asking with whom the student would be most likely to discuss various academically-related topics, and with whom ideally the topics should be discussed. The dental students indicated that 59% of the topics ideally should be discussed mainly with faculty

members, 37% should be discussed with both faculty and students, and only 2% should be discussed mainly with students. However, they responded that in reality it was likely a student would be able to discuss only 14% of these academically-related topics mainly with faculty members, and 25% with both faculty and students, leaving 52% of the topics to be discussed mainly with students. This suggests, that in resolving informational and attitudinal questions related to dental education, dental students strive to fill an unsatisfied need by transacting with students what they might accomplish in conversations with faculty members, if the opportunity were more available. Many of these interactions appear to contribute directly to the learning process. The questions of whether a higher proportion of student-faculty interactions would be more beneficial, and whether certain kinds of architectural design could help increase the proportion, remain to be examined in future studies.

To classify the kinds of activities in which students were engaged when informal conversations occurred, four categories were used: (1) "Doing", which meant carrying out some specific stationary activity; (2) "Waiting", which meant waiting for an activity to begin; (3) "In Transit", which referred to activities in which a person was going to a specific destination; and (4) "Roaming", which referred to activities in which the person was moving about the building without having a specific destination in mind, although possibly he was seeking a certain kind of environment. Categories 1 and 2 refer essentially to stationary activities, while 3 and 4 refer to activities in which the individual is going from one place to another. Another difference is that Categories 1 and 3 have a more clearly defined purpose, than 2 and 4. Since many conversations occurred while students were eating lunch, "Eating" was added as a sub-category under "Doing". Activities occurring when the conversation took place were distributed among the categories as follows:

32% Doing, 10% Eating, 20% Waiting, and 34% In Transit. Only 4% of the conversations occurred during Roaming activities, although some individuals seemed to roam whenever they had the chance.

The number of conversations recorded for an activity category is, of course, in part related to how much of the academic day is spent in activities falling into that category. However, it is clear that some activities which may take only a small proportion of the day may be associated with a disproportionately high number of conversations, perhaps as a result of supplying an especially favorable interactional setting or increasing the probability of encountering individuals with whom interaction is desired. In addition to influencing frequency, the nature of the activities may affect the length of conversations. For example, certain activities, such as working in a several-man lab, may tend to encourage many short conversations, while other activities, such as eating, often encourage a smaller number of conversations which are longer and more sustained. Thus characteristics of interactions may differ according to the accompanying activity which partly provides their setting. In turn the nature of the activity is partly determined by the location in the building where it occurs.

When one looks at the locations in the dental school buildings where informal conversations occurred, 59% took place in hallways, locker-rooms, and cafeterias, where students have most freedom to talk; 27% took place in relatively free spaces such as clinics, laboratories, and library; and only 13% took place in the behaviorally restricted settings of lecture halls and classrooms. One notes here that the largest percentage of conversations occurs in the "free" zone of hallways, locker-rooms, and cafeterias, although the smallest proportion of the day is spent in these settings. But while there are many conversations in hallways and locker-rooms, most

of these are brief and hurried and do not permit extensive discussion of a topic.

Turning now to the content of the conversations, 49% pertained to academic work, such as discussion of a lecture just heard; and 26% consisted of comments and gripes relating to social-emotional aspects of academic work, such as the grading system and faculty personalities. The remaining 25% dealt with personal and social matters, such as dating, football games, and fraternity activities. The finding that three-fourths of the conversations recorded were academically-related is interesting, because school administrators and faculty members may not realize the percentage can be this high, and thus may conclude that most student conversations make no contribution to the educational process. Further research might show the extent to which different kinds of interactions about academic matters contribute to the learning process, as well as the way in which specific architectural variables can contribute to favorable conversational settings and desired patterns of interaction.

Relating the findings about students' conversations to the architectural variables of design and layout of the dental schools must be done descriptively here, since we as yet know of no usable scale along which various buildings can be placed in order to examine the effect of architectural variables quantitatively.

The following architectural variables were considered to be of interest: the compactness or extendedness of the building; the location, layout, and inter-relationships of various building components such as classrooms, laboratories, faculty offices, and lounges; sizes of these spaces; the kinds of corridor systems; the number and placement of entries into the building; and the number of stories. It was felt these variables might influence the quantity and quality of informal conversations by affecting such factors as the amount of face-to-face contact between

people in the building, the patterns of traffic flow, the "mix" of persons composing conversational groups, and the size of these groups. As better methods of characterizing architectural variables are devised, it should become increasingly possible to examine the correlation of these with specific dependent variables relating to interactional behavior.

We theorized that the design of educational buildings may in part determine which persons who are in movement are likely to encounter each other; as well as whether persons who are stationary in rooms are grouped so they can talk while involved in certain learning tasks, or whether they work in relative isolation. Also, architectural variables may influence the size of conversational groups, causing them to be quite small with just two or three participants, or causing them to be larger with five or more participants. In addition, architectural variables may influence the temporal patterning of conversations, causing them to occur frequently or less frequently, which in turn can affect the length of conversations. We further speculated that not all kinds of learning may benefit from social interaction. However, for certain kinds of learning, informal conversations may be particularly beneficial, and in addition there may be optimal interaction patterns for learning as far as group size, mix, and number of interactions are concerned.

We will begin by describing some conversational patterns occurring during relatively stationary activities of dental students. One student's clinical cubicle, containing a dental chair and related equipment, was located so it was the first in a row of 12 such work spaces. Other students passed his location as they came from the elevator, placing this student in a "gatekeeper" position. Most of his conversations occurred at the beginning of each clinical period, as he talked briefly with the passing students, while preparing for his first patient. A variation of the gatekeeper position was noted in cases where a departmental office was located off a

narrow hall that connected a lecture room and laboratory. As students passed through this narrow space, they often had an opportunity to stop and talk informally with faculty members occupying the office. The opposite of this situation of easy accessibility occurred when faculty offices were placed in a dead-end or off-the-beaten-track location, which assured that no students would pass through this area unless they had a formal appointment with their instructor.

In another situation, observed by the investigators, a student occupied a cubicle in the middle of a row. Most of his conversations occurred during the clinical period, and were with his neighbors to either side or across from him. Similar patterns were noted with students working at laboratory benches. The students in the middle of the bench, like the student in the middle cubicle, tended to have more interactions than the students at the ends. This is similar to Festinger's finding in his study of student housing, which showed that students living in the middle of a row of apartment houses had more interactions than those living at the ends. In each case, one explanation is that persons occupying the middle locations have more neighbors, giving them more choices and greater likelihood of finding others with whom they can interact congenially. Considering these situations -- in which individuals might be located in a gatekeeper position, or middle position, or at the dead-end of a row -- one can see that differences in location can have an influence on informal conversations in terms of frequency, length, and content, as well as the number of persons involved. Similar effects are found when one moves from examining locations within a single space to the location, layout, and inter-relationships of various building spaces.

Finally, turning to conversations occurring while students are in transit, moving from one part of the building to another, the route followed may influence both the frequency and content of conversations. The number of alternate routes is

affected by the architecture of the building, and where choices of route exist, the student may select his route so as to maximize the kind of interactional encounter he is seeking at that time. For example, he may desire to encounter an instructor or another student to clarify an assignment, and will select his route to achieve this purpose. Through interviews it was learned that one student, working in an old building with an irregular and inconvenient layout -- which forced him to make detours and longer trips, but also offered many alternate routes -- found his trips provided opportunity for a wide choice of conversations, which could be held with certain students or faculty members, and with greater or less frequency, depending on the route he selected. Another student used his free time during clinical periods to roam to different parts of the building in order to see what others were doing, and to learn what he could in an informal way. He used routes that would let him stay in "safe" areas, where he would meet friendly faculty members, and avoided "unsafe" areas where he would encounter an unfriendly reception.

The data and explanations reported from this exploratory study represent only a beginning in trying to examine certain relationships between architectural and behavioral variables. By analyzing dental students' conversations in terms of both architectural and behavioral variables, one obtains a fuller account of how a building's design can influence the use people make of it in carrying out their activities. Inclusion of social factors into architectural thinking may lead to improved design of buildings and more effective functioning on the part of the users. Subsequent research might study the extent to which informal interactional patterns can influence students' attitudes toward learning and the amount of information they learn. Next one would study the specific contributions that the different kinds of interactional patterns can make, and how these patterns can be modified by building design. With this information available, planners could then consider what kinds of interactional patterns are desirable in buildings, and how these can be encouraged by the architecture.